```
**********************************************************************
*                                                                    *
*          QQQQQQQQ        ZZZZZZZZZZ      XX      XX              *
*         QQQQQQQQQQ       ZZZZZZZZ         XX    XX               *
*         QQ      QQ             ZZ          XX XX                 *
*         QQ      QQ            ZZ            XXX                  *
*         QQ      QQ           ZZ             XXX                  *
*         QQ    QQ QQ         ZZ              XX XX                *
*         QQQQQQQQQQ         ZZZZZZZZ         XX   XX              *
*          QQQQQQQQ         ZZZZZZZZZZ       XX     XX             *
*                 QQ                                                 *
*                                                                    *
**********************************************************************
```


The Journal Covering Amateur Radio & Sinclair Computers
ZX-80; Micro-Ace; ZX81; T/S 1000, 1500, & 2068

2025 O'Donnell Drive
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88001

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W4GHV/5 — Bo Barry — Editor

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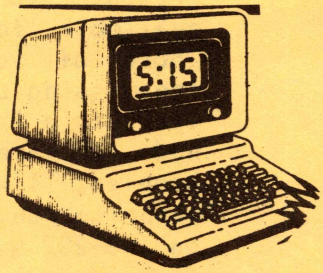
COMING UP

Hunter's Bank Switching Operating System (BSOS) for the ZX-81 & TS-1000. Note: HM6116LP-3 RAM chips for the Hunter expansion board are available from him for 3/$10.00. See his ads in QZX.



WORLD'S SMALLEST COMPUTER
(see unclassified ads)

Editor's Doings
Bo Barry, W4GHV

Well, for the first time since QZX started up, our 'reserves' of material to be printed has decreased. I went thru ALL of my past files, surveying what we had failed to print, failed to answer, etc and it brought back a lot of fond memories. Hopefully those who had questions sent to us, to find them lost in 'the big bit bucket in the sky' aren't too disappointed. I think we have done a fairly thorough job of answering mail. Those of you that have submitted articles and have never seen them in print are urged to re-submit your latest creations. Some of the programs were just too messy or faint to be printed, and Alex & I just don't have enough time to re-type and print the programs. An article submitted this month in blue ink, no less, was retyped to save space and improve readability.

We are grateful for the burst of correspondence we recently received. It contained several excellent articles, some of which appear in this issue. I have two BASIC programs I'm working on for future issues, one is an electronic circuit analysis program that will solve for the voltages, etc for most any circuit, and another one, called "Bo's Grocery Store", shows how to tackle multi-dimensioned arrays. It was used in a beginning programming course I taught a while back and I thought I would try to adapt it to the Timex.

Other irons in the fire include some more work with the speech synthesis chip described in a recent issue. It almost works with my TRS-80 III and some work remains.

Those interested in doing some voice digitizing and playback should get a copy of a brief article that appeared in the Sept '85 issue of Computer-Digest which is really Radio Electronics magazine. The program allows storage of about 5 seconds of voice in a 16K RAM.

Also in the works is a small article on **PACKET RADIO**, another fascinating mode of communications for those with a computer (yep, the Timex counts) and a VHF rig. Some work is being done on HF as well. I'm giving a presentation at tomorrow's ham club meeting and have a nice video tape obtained from AEA to use. Those of you already involved in packet and those interested in it are urged to drop me a postcard!! Let me know what you have done or how interested you are in it. Don't ask for anything, I'm backlogged on work to do! The amount of coverage put in **QZX** will depend upon how much interest we find among the subscribers.

On to a few more goodies, listed in separate paragraphs to get your attention.

Crazybugs

This TS-2068 game cartridge, which was used extensively to check out the TS-2068's we sold, will be given to the sender of the THIRD postcard we receive! (or the second or first if three aren't received). It's a cute little pacman like game guaranteed to cause your blood pressure to rise when the gremlins chase after you. The 2068's were each checked out extensively before being shipped. One had a slightly intermittent power plug so it was replaced. Being short of desk space, I unfortunately did not add one to my personal collection. My ZX-81 & TS-1500 remain and serve me well. (Along with my Tandy Model 100, Model I, III, Sanyo MBC-555, several 68000 development systems, and new ARC X-Turbo XT-clone).

Fido Bulletin Board System

The old TRS-80 Model I has finally been retired! **Teachers_Pet** bulletin board is now running on a 7MHz XT clone computer as a Fido bulletin board. Net #15, Node # 1006. More details on the Fido network will be in a future issue. The bulletin board will have message & file areas for the Timex/Sinclair as well as other computers. Submit your articles to QZX, or upload any programs you think may be of interest. I will keep you posted here as to the download programs we have available (none at present for the Timex. Some are available for MS-DOS & Sanyo users). Those of you not hooked on 'modeming' are missing out on a lot of fun. If you live in a larger city, the fun can be had for free. If you live in the boonies, like us, your phone bill will surprise you. Anyone having information on RS-232 & modem interfaces are urged to send it in so we can pass it along to others.

Call Teachers_Pet Fido BBS @ 505-646-5194, or send a message via your local FidoNet BBS by sending a message to net/node 15/1006. Full access (30 min

limit) is given to everyone. Speeds: 300, 1200, 2400.

Log Yagi Program for the TS1000
Kit Kohlmoos - W6ISO

Log Yagi is a fantastic design program for one of the hottest antennas I have ever had. The original article was in QST, Dec. '76. Claimed gain is 11.5 dB/dipole. I believe it and have used it on 15 meters for the last 7 years. I'm in the middle of range testing a 70 cm model to prove what the article claims. Anyway, the design calculations are tedious and it's easy to make a mistake, so this program is the result. Element lengths may have to be trimmed to frequency depending on their diameters. It's within a couple of inches at 21 MHz.

The program listing and sample printout appear elsewhere in this issue.

M-LOG Program
John McGinley, N9BBN

M-LOG is a simple BASIC program with a machine language subroutine for searching memory for duplicates. The BASIC program is easily modified for new tasks which you might need. The machine language routine provides the speed necessary for logging and duping under contest conditions.

First of all, if you anticipate working more than 400 stations, you must change some statements in the program. The '400' is statements 11 & 12 must be changed. The limit for 16K RAM is about 650 calls. You will want to put your own call sign into statement 20.

Once you RUN the program, be careful not to RUN it again or you will lose your data. Follow the prompts and enter the band (W$) & mode (M$). Next you will be prompted for a call sign. Here is where the machine language takes over. QSO info for any contact in memory that matches the entered call sign will be printed on the screen. Now you decide whether or not to log the call. If you decide to log the call, you answer the prompts. Typing ENTER means "YES", log this call. If you type MENU instead of a call sign, you can choose to input another call, change bands, or stop. Again, do not RUN or CLEAR. To re-enter the program after a STOP, type GOTO 20.

Just for fun, I put my call sign into B$(400) five times. I also put in N9BNB (almost my call) several times. When I then searched for my correct call, the computer took 0.25 seconds to search the whole array and print the dupe data in the SLOW mode! If there's a faster program, I'd like to see the disassembled listing!

Since the program runs exclusively in SLOW, you might want to add W8FNQ's software clock and menu options for resetting. The machine language routine can be modified by those of you who know machine language. The routine is pretty flexible and should be easy to modify. For instance, it's clear that for Field Day, this program isn't exactly what you need, although it could certainly be used. The disassembled listing is elsewhere in this issue.

If you don't want to type in the program from the listing here, send me a check for $8 and I'll send you a cassette with the program ready to go.

Next month, we'll look at some more of the possible new machine language routines, the sorting of the log and printing of the dupe sheet. The program listing for this program appears elsewhere in this issue. (ADR: 203 Milwaukee St., Mauston, WI 53948)

M-LOG Addendum

The 1 REM statement needs a little explanation. It needs at least 269 arbitrary characters. Use FAST or it will take forever to create it. This is where the machine language routine will reside after you poke it in from the enclosed list. RUN 1000 to help you get them all in. After you finish, you may delete lines 1000-.

MLI 2.0
WA6DLI

I have been using a copy given for testing of John McGinley's MLI 2.0. It is a CW program for the NU4V interface and ZX81/TS1000/1500 that gives QSK (break-in), error correction of transmit buffer and 8000 bytes of saved received message that can be viewed, edited, and printed. With good reception, you can even copy W1AW cw bulletins and read them later or print them out. It is fantastic but somewhat of a shock to have to type in real time on sending when you were used to preparing a message as you watched the incoming. But now you don't have to dump a filled buffer to answer a quick break from the

other end! The program was advertised in the July issue, so I wanted to say it was great and worth the wait.

ERROR

WA6DLI writes that he should have said that the price of the FIGARO program which he reviewed in the last issue (July) was $19.95 instead of the price which was quoted in the article.

Impedance Errors

The article on Antenna Impedance on QZX Vol. 2, Nr. 10 (Half Wave Dipole Calculations) had the SWR calculated incorrectly. Lines 2170 thru 2176 should be replaced by the following five lines.

```
2170  LET NRH2=(R*R-Z0*Z0+XCL*XCL)*(R*R-
Z0*Z0+XCL*XCL)+4*Z0*Z0*XCL*XCL
2171 LET NRH=SQR(NRH2)
2172 LET DRH=(R+Z0)*(R+Z0)+XCL*XCL
2174 LET RHO=NRH/DRH
2176 LET SWR=ABS((1+RHO)/(1-RH0))
```

QZX FRIENDS

KA2LHO -- Kraig has been busy with computer curriculum development and even using his T/S 2068 for typesetting. (See his ad in last month's issue for the Ham programs he has developed.)

KV3Q -- Bob is a new subscriber who lives in Maryland, but spends every winter living in Florida on his sailboat. He operates both his radio and his computer from the boat so is marine mobile with his ham gear and computer. He uses a Radio Shack auto adapter for the Timex.

W5UNU -- John used a T/S 1000. Memotech I/F, Byte Back UM-64, Gemini 10X, and Word Sinc II.4 to write us a long letter containing some hints which appear in Bits and Bytes. He is also looking for a copy of "The Complete Timex TS 1000/ZX 81 ROM Disassembly" by Logan and O'Hara.

W1YCW -- Donald has both a ZX81 and a T/S 2068. He is still looking for a good printer.

K0REC -- Spence sent us an order for a T/S 2068, a fancy calling card, and a booklet listing the personnel and payloads of all the scheduled shuttle flights.

K6CHS -- Don allows as how he likes QZX and wants us to keep publishing stuff on the ZX81 type because he is still chugging along with only that type. Then he says he has four ZX81's, a centronics parallel interface, a memotext w/p, a Radio Shack 80 column printer, five full size keyboards, three 2040 printers, KA2LHO software, NU4V CWSS board, and a bunch more junk. He seems to be chugging pretty fast! (note four computers and five extra keyboards)

K5TQM -- Jack says he has two T/S 1000's one with a TI/99A keyboard. He has ordered a Gladstone 64K bareboard to expand his memory.

WA6DLI -- Bob sends us a note on his Sinclair activities. He has hooked up a Microdrive interface with two ZX Microdrives, OMNI-EMU ROM Emulator, and Z-Link edge connector adapter to simulate a Spectrum. With good wafers, it all works like a charm, but some of the wafers he has seem to be defective or maybe returns that got back into circulation. He says "I am almost sure that some I got were bad. While the ZX Microdrive system is very sophisticated for handling files, networking, and formats like a disk system .. it may be that the cartridge or wafer needs higher quality control. The wafers in my A & J type (original Exatron-CAI) stringy-floppy system for my ZX-81 are still going strong after almost three years. The ZX Microdrives are very fast when all is working correctly and the ability to go from cassette to microdrive and back is great.

BITS AND BYTES

52. Want SCROLL for your T/S 2068? Try POKE 23692, 1 or 2 where you would scroll on a ZX81.

53. Problems with non-compatibility between Spectrum software and the various adapters for the T/S 2068 (ROMswitch, Chameleon, etc.) have been traced to 10 K ohm pull-up resistors used in the Spectrum to insure that IN statements from the keyboard read 255 when no key is pressed. The Timex keyboard is different. Most converters can be modified with appropriate resistors; some newer models already have been.

BASIC software incompatibility is often due to a difference in RAMTOP. The 16 K programs are particularly vulnerable. Consult appropriate manuals for necessary modifications.

54. Spare ROM's and ULA's can be bought from Hal-Tronics for $4.95 each (see ads in Ham Radio and 73 for address).

55. W5UNU sends some information on tape saving. If you use a Panasonic Slimline tape recorder (no counter) set at "5". It loads every time. Use this recorder set at "8" with the "Quick :oad" program (not Quick Save") and it loads every time as well. Q-load runs 11 times faster and Q-save 13 times faster than the computer by itself. Q-load does not require an external filter and amplifier while Q-save does. Either of the two programs load the TS about as fast as the Commodore DISK loads! Many tape recorders are condemned and nothing is wrong with them. It is the tape that is not worth it's salt. Premium tape like Tapemaster's Compusette+ tape is recommended for the "quick" programs; no cheap off brand tapes will save and load.

ZX81-MEMOTECH INTERFACE
Dennis Sladen VE1HO

If you are one of those guys who has acquired a used 16K Memotech board for your ZX81, chances are, like myself, that you did not get the user's booklet that comes with a brand new unit.

I purchased one of Paul Hunter's Non-Volatile Memory boards and it worked well on the 2K ZX81. The 16K Memotech board worked well on its own with the ZX81, but the three just would not cohabit amicalably. Placing the board fore and aft of the NVM board produced the same results - wiggly screen image.

At the local flea market, I saw a packaged Memotech board for sale and upon looking into the booklet came across the answer to my problem. The switches have to be reset on the Memotech board. I tried it and all works well. Here for others in the fraternity is the information regarding the switches. I suppose this phenomenon would hold true for any board that is to cohabit with the Memotech 16K memory board.

The ZX81 and ATV

John J. Shelley, WA1IAO, writes about his use of the ZX81 in an amateur TV (fast scan) set up. He says "I have two ZX81's and a 2068. One of the 81's has been operating steadily, practically, for over two months at a repeater site where it is modulating an ATV beacon - soon to be a repeater. It presents a sequence of group members calls made with print statements forming large block letters. The only attention required has been to reload after power failures. It is practically RFI proof, when not loading, thru the use of a 3x10x12 chassis, sloped for a keyboard. Included is a recessed plug / line filter assembly feeding the original power pack which is inside.

"Most of my activity, at the present time, is in ATV (fast scan). I'm trying to convince the group that the computer is the only way to go in order to prevent the, almost, complete fades in activity that have occurred - due to boredom. Along with this is the recommendation to learn what the computer can do and not depend on software vendors.

"Unfortunately, there are only two of us using T/S units; but we've raised a few eyebrows by showing what a terrific job the both will do.

"The newer TV sets, having a 42 pin chip, look like they're all made at Samsung, in Korea. I've used them, by removing a jumper and replacing it with two coax's and a switch, to bring video out and in and the timex computers work perfectly on direct video entry with this set up. Everything is hot chassis these days, including expensive Sony and Panasonic monitors, but I've had no problem. All my wiring is polarized to go along with the polarized plugs.

"The sets seem to work quite well with no discernible loss of quality, in over a year's use, and can be used for an ATV receiver, direct video monitor, and a demodulator for a repeater. They also lend themselves to experimenting with a flying spot scanner. One thing I have to refine is shielding for TVI which can be wicked at a transmitter site."

RTTY PROGRAM REVIEW
Bob Howard WA6DLI

Here is an advance review of a sensational RTTY program from G1FTU that will probably be offered by ads in QZX by Hans SM3HBQ. It is written for the Spectrum and they want to get it and the SCTV program in a version for the 2068 before offering it in the USA.

The G1FTU SCTV program seems to almost work; but even with a Spectrum ROM, it is running afoul of the AROS

system, I think. I sent a directory of Spectrum versus 2068 addresses to Hans for G1FTU.

The RTTY program, however, may be unique as it requires no hardware in the way of a modem or TU unit ... just the computer! The earphone jack connects to your speaker or earphone/phone patch output and the "save" jack to the microphone input of the rig. To test it, I have been playing it into the cassette recorder and playing the saved copy back for decoding and it works perfectly.

My initial tests on the air were at first nothing but gibberish until I figured out that the baud rate is really baud rate. What we think is baud rate here is often "words per minute"; at least that is what my Kantronics Mini-/Reader "baud rate" is. So for all new RTTY novices 45 baud is 60 words per minute, ham band speed. 50 baud is 66/67 words per minute (most used commercial), 57 baud is 75 WPM (seldom used), and 74 baud is 100WPM.

When I set the baud to 45 and listened on the ham band I did get a clear copy on W7MCC and N3AVA just through the earphone jack. The band conditions were not good so I consider this a real feat. Learning to tune teletype and find right filter settings takes some learning, but the screen on receive in the G1FTU program has some moving bars and an indicator that enable you to tune correctly. On the HF band you have to get a station in the clear or do some tricky maneuvering with pass band control and filters. I think the unshift on space selection would allow decoding of mark signal only with a very narrow filter as in done with most of the UART systems. This may allow the sharp filters in the rig to substitute for an expensive TU with good filtering.

As my copy of the program was a sample without documentation, I have not tried to transmit with my rig as I am not sure whether I should use RTTY, SSB, CW, or AM position just feeding the mike jack. The program requires an Emulator or ROM switch in the version I am using, but looks like a winner when it becomes available as the software only RTTY system!

Printed in this issue is a copy of the opening screen of the RTTY program and a copy of the initial menu.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: CWSS users! MLI 2.0 permits QSK operation without prompting and can save Rx text for review on the screen or hard copy. Send $12.50 for MLI 2.0 or SASE for info sheet. John McGinley N9BBN/203 Milwaukee St./Mauston, WI 53948

FOR SALE: Plastic strips to allow QZX to easily be placed in a three ring binder. Twelve reusable strips $3 postpaid. See Mr 85 issue for more details. Alex. F. Burr, K5XY, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: Brand new, checked out T/S 2068 computers. Complete. Only $99.95 plus $5.00 for UPS within continental United States. SOLD OUT (You didn't expect this bargain to last forever did you?) QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: The world's smallest computer (maybe). Computing power is limited to keeping time and date only. Comes with swivel base, simulated keyboard, built-in power supply, and 1" monitor. All this for only $5 (includes postage). Bo Barry, 1967 Defiance Ave., Las Cruces, NM, 88001.

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READ/DATA/RESTORE ON THE ZX-81/TS-1000 !

By Clem Wehner K5KGM

Though the BASIC in the ZX and TS computers is excellent, it does lack READ, DATA,and RESTORE statements. To get around that shortcoming we usually store data in variables. The procedure in this article will give you READ/DATA/RESTORE capability. The idea was inspired by a brilliant article in September 1983 Sync magazine by John Richard Coffey.

What must be done is to enter a short machine language program, store it on tape, then load it into your computer before writing a BASIC program that uses READ and DATA. The entire program will reside in the first line of program (1 REM) and only take 80 bytes. Here's how to do it:

1. Turn on the computer and type in this program:

```
1 REM 00000.....(put 80 zeroes in this
  line)
5 LET X = 0
10 FOR I = 16514 TO 16592
20 PRINT "ENTER NUMBER"
30 INPUT A
40 POKE I,A
50 LET X = X + A
60 CLS
70 NEXT I
80 PRINT "CHECKSUM = "; X
```

2. Now, RUN the program. Enter the following numbers reading from left to right and top to bottom.

TABLE 1

33	250	64	62	234	1	255	255
237	177	1	5	0	167	237	66
62	118	190	40	5	9	34	123
64	201	9	24	230	42	123	64
62	118	190	204	133	64	126	35
24	236	42	20	64	43	229	43
43	227	229	205	159	64	225	6
26	184	40	13	119	35	227	52
32	3	35	52	43	227	167	48
233	227	225	0	195	157	20	

3. Double check that you entered the numbers correctly. The checksum should equal 8533 . If it doesn't then you made an error. Run this diagnostic program, by entering it then enter GOTO 100.

```
100 FOR I = 16514 TO 16592
110 PRINT I ; " = " ; PEEK I
120 NEXT I
```

Compare the numbers on the screen with Table 1. If you find your error POKE the address that had the error with the correct number. e.g.(POKE 16514,33) .

4. Delete all program lines except line 1.
5. Save the program on tape.

To use this new program to write a program using the READ/DATA concept do this:

1. Load the 1 REM program you just saved.
2. Write your BASIC program, making substitutions as follows:

   In place of RESTORE, use RAND USR 16514

   In place of READ, use LET A$=" "
   RAND USR 16556

   (NOTE:Any string variable may be used).

   In place of DATA, use REM

   NOTE: commas must separate each item in the REM statement. Therefore, there can be no commas as part of the data. There must be a comma following the last data item. e.g.:

```
100 REM  Mike,Jim,Ben,Kenneth,END,
```

3. That all there is to it. You may now store data in REM statements. The REMs can be located anywhere in your program. BUT, you cannot have other REM statements (other than line 1 REM) preceding those holding your data. Therefore it's a good idea to put the data REMs at the beginning of your program (starting with line 2).

   To stop the reading of data, have your program check for an END or any data terminator you chose.

4. EXAMPLE PROGRAM 1. Here's how it works:

```
10 RAND USR 16514
20 LET A$ = ""
30 RAND USR 16556
40 IF A$= "END" THEN STOP
50 PRINT A$
60 GOTO 20
100 REM MIKE,JIM,BEN,KEN,END,
```

Line 10 acts like RESTORE and tells the program to read the first data item. Line 20 clears A$. Line 30 reads the first data item in the REM statement (MIKE) and stores it in A$. Line 40 checks for the end. Line 50 prints the contents of A$ (MIKE). Line 60 sends the program back to line 20 to begin reading the next data item (JIM). This looping continues until the program reaches the END.

EXAMPLE PROGRAM 2 "MAILING LABEL MAKER"

```
2 REM CLEM WEHNER,2135A WILLOWWOOD,
  SCOTT   IL   62225,
3 REM BILL JONES,1234 S. STREET,
  ANYTOWN  AZ   76311,
4 REM END,
10 RAND USR 16514
20 LET A$ = ""
30 RAND USR 16556
40 IF A$ = "END" THEN STOP
50 LET B$ = ""
60 RAND USR 16556
70 LET C$ = ""
80 RAND USR 16556
85 REM PRINT LABELS
90 PRINT A$
100 PRINT B$
110 PRINT C$
120 PRINT
130 GOTO 20
```

IMPORTANT: Note the commas at the end of each REM including the END. Commas are not used within the data elements, but only to separate elements. If you get garbage when you run this program, you probably forgot the commas or forgot to check for the data terminator (END). Line 85 is OK because it is after the last data REM.

This program corrects one of the few major shortcomings of the Timex Sinclair computer. Use it to keep a log, to keep records of parts on hand, etc. I hope it serves you well. (If you don't want to type it all in, I'll make a tape copy of the program for you for $3.50. My address is in line 2 of Example Program 2). 73's es gud hamming.

```
 A 6 ELEMENT LOG YAG ANTENNA
        BY W6ISQ

TO CALCULATE THE DIMENSIONS OF
THE ELEMENT LENGTHS AND SPACING
OF A 4 ELEMENT LOG PERIODIC
ANTENNA WITH DIRECTOR AND REFLEC
TOR.

INPUT UPPER FREQ LIMIT, FU: MC
      FU=14.35 MC
INPUT LOWER FREQ LIMIT, FL: MC
      FL=14 MC
      BW=1.025
      BS=1.17875
       T=0.94665725
   COT A=3.7493379


  *ENTER CONT, TO CONTINUE*
    LOG CELL ELEMENT LENGTH

      L1=421.71429 INCHES
      L2=399.21869 INCHES
      L3=377.92345 INCHES
      L4=357.76398 INCHES

    LOG CELL ELEMENT SPACING

      S12=42.171429 INCHES
      S23=39.921869 INCHES
      S34=37.792345 INCHES

 REFLECTOR LENGTH AND SPACING

    LREF=436.8 INCHES
    SREF=72 INCHES

 DIRECTOR LENGTH AND SPACING

    LDIR=386.4 INCHES
    SDIR=126.85714 INCHES
REF  ____________

L1     ____  ____

L2       ____  ____

L3         ____  ____

L4           ____  ____
               X  X

DIR    ____________

*BOOM LENGTH=321.74281INCHES
  (ALLOWS 1.5 INCHES AT ENDS)


*TRANSPOSE FEED BETWEEN L4-3-2-1
*FEED AT X-X. INPUT Z IS 50 OHMS
```

```
  9 REM "LOG YAG"
 10 REM FROM QST DEC 76
 90 SLOW
100 PRINT
120 PRINT "  A 6 ELEMENT LOG YAG ANTENNA
"
130 PRINT "          BY W6ISQ
"
135 PRINT
140 PRINT "TO CALCULATE THE DIMENSIONS OF"
150 PRINT "THE ELEMENT LENGTHS AND SPACING"
160 PRINT "OF A 4 ELEMENT LOG PERIODIC "
170 PRINT "ANTENNA WITH DIRECTOR AND REFLECTOR."
175 PRINT
180 PRINT "INPUT UPPER FREQ LIMIT, FU: MC"
200 INPUT FU
210 PRINT TAB 7;"FU=";FU;" MC"
230 PRINT "INPUT LOWER FREQ LIMIT, FL: MC"
240 INPUT FL
255 REM BAND WIDTH
260 PRINT TAB 7;"FL=";FL;" MC"
270 LET BW=FU/FL
290 PRINT TAB 7;"BW=";BW
310 LET BS=1.15*BW
320 PRINT TAB 7;"BS=";BS
330 LET T1=(LN BS)/3
335 LET T=1/(EXP T1)
340 PRINT TAB 8;"T=";T
350 LET COT A=0.2/(1-T)
360 PRINT TAB 4;"COT A=";COT A
370 PRINT
380 PRINT AT 21,3;"*ENTER CONT, TO CONTINUE*"
390 STOP
400 PRINT TAB 5;"LOG CELL ELEMENT LENGTH"
405 PRINT TAB 5;"
"
410 LET L1=(12*492)/FL
420 PRINT TAB 7;"L1=";L1;" INCHES"
430 LET L2=T*L1
440 PRINT TAB 7;"L2=";L2;" INCHES"
450 LET L3=T*L2
460 PRINT TAB 7;"L3=";L3;" INCHES"
470 LET L4=T*L3
480 PRINT TAB 7;"L4=";L4;" INCHES"
490 PRINT
500 PRINT TAB 4;"LOG CELL ELEMENT SPACING"
510 PRINT TAB 4;"
"
520 LET S12=.5*(L1-L2)*COT A
530 PRINT TAB 6;"S12=";S12;" INCHES"
540 LET S23=T*S12
550 PRINT TAB 6;"S23=";S23;" INCHES"
560 LET S34=T*S23
570 PRINT TAB 6;"S34=";S34;" INCHES"
590 PRINT
600 PRINT TAB 2;"REFLECTOR LENGTH AND SPACING"
610 PRINT TAB 2;"
"
620 LET LREF=12*509.6/FL
630 PRINT TAB 5;"LREF=";LREF;" INCHES"
640 LET SREF=84*12/FL
650 PRINT TAB 5;"SREF=";SREF;" INCHES"
655 PRINT
660 PRINT TAB 2;"DIRECTOR LENGTH AND SPACING"
670 PRINT TAB 2;"
"
680 LET LDIR=450.8*12/FL
690 PRINT TAB 5;"LDIR=";LDIR;" INCHES"
700 LET SDIR=148*12/FL
710 PRINT TAB 5;"SDIR=";SDIR;" INCHES"
712 STOP
750 PRINT AT 0,0;"REF      ____
____"
760 PRINT AT 3,0;"L1       ____
____  ____"
770 PRINT AT 5,0;"L2         ____
____  ____"
780 PRINT AT 7,0;"L3           ____
____  ____"
790 PRINT AT 9,0;"L4             ____
____  ____"
800 PRINT AT 13,0;"DIR      ____
____"
810 PRINT AT 10,17;"X X"
815 PRINT AT 15,0;"*BOOM LENGTH=";S12+S23+S34+SREF+SDIR+3;"INCHES,     (ALLOWS 1.5 INCHES AT ENDS)"
820 PRINT AT 20,0;"*TRANSPOSE FEED BETWEEN L4-3-2-1."
830 PRINT AT 21,0;"*FEED AT X-X, INPUT Z IS 50 OHMS"
```

```
4082  2A1040  ld HL,(vars)          initialize
4085  110600  ld DE,0006
4088  19      ADD HL,DE             (A$(1))
4089  7E      ld A,(HL)
408A  1605    ld D,5                Sumcode
408C  23      INC HL                next chr$
408C  5E      ld E,(HL)
408E  83      ADD A,E
408F  15      DEC D
4090  20FA    JRNZ    next chr$
4092  23      INC HL                poke sumcode to (A$(7))
4093  77      ld(HL),A
4094  322140  ld(4021),A            store
4097  1E0F    ld E,15
4099  19      ADD HL,DE             re-initialize
409A  BE      CP(HL)                does sumcode match sumcode
409B  2811    JRZ   ident?          in memory?
409D  111400  ld DE,20d             next n(length of entry)
40A0  19      ADD HL,DE
40A1  E5      PUSH HL               stack adr of next entry
40A2  ED5B7B40ld DE,(limit)         limit of array B$
40A6  C600    ADD A,0               reset carry flag
40A8  ED52    SBC HL,DE             past limit?
40AA  E1      POP HL                retrieve ad of next entry
40AB  38ED    JRC   sumcode same...?
40AD  C9      RET                   search over
40AE  2B      DEC HL                ident?
40AF  E5      PUSH HL               ad of 6th chr$
40B0  2A1040  ld HL,(vars)
40B3  110B00  ld DE,12d
40B6  19      ADD HL,DE             (A$(6))
40B7  E5      PUSH HL
40B8  D1      POP DE                move(A$(6))
40B9  E1      POP HL                as of 6th chr$
40BA  0605    ld B,5                CP 5 times
40BC  1A      ld A,(DE)             COMPARE CHR$
40BD  4E      ld C,(HL)
40BE  B9      CP, C                 Is this chr$ a dupe
40BF  2006    JRNZ   no dupe
40C1  2B      DEC HL
40C2  1B      DEC DE
40C3  10F7    DJNZ   COMPARE CHR$   check next chr$
40C5  180C    JR +12                bounce to next n
40C7  3E06    ld A,6                reset regs to check next en-
                                                          try
40C9  90      SUB A,B
40CA  4F      ld C,A
40CB  0600    ld B,0
40CD  09      ADD HL,BC             HL is ready
40CE  3A2140  ld A,(4021)           A is ready
40D1  18CA    JR   next n
40D3  18      JR   print            call is a dupe:print data
40D5  28      "C"                   data for header
40D6  26      "A"
40D7  31      "L"
40D8  31      "L"
40D9  37      "R"
40DA  35      "P"
40DB  39      "T"
40DC  36      "Q"
40DD  39      "T"
40DE  2D      "H"
40DF  27      "B"
40E0  26      "A"
40E1  33      "N"
40E2  29      "D"
40E3  32      "M"
40E4  34      "O"
40E5  29      "D"
40E6  2A      "E"
40E7  3E00    ld A,0                2 sp
40E9  D7      RST 10                print a space
40EA  D7      RST 10                again
40EB  C9      RET
40EC  7E      ld A,(HL)             b ch;ld chr$
40ED  D7      RST 10                print it
40EE  23      INC HL                next
40EF  10FB    DJNZ   b ch
40F1  C9      RET

40F2  E5      PUSH HL               stack ad of data to print
40F3  2A0C40  ld HL,(d file)        is header printed?
40F6  114500  ld DE, 69d            loc of header in d-file
40F9  19      ADD HL,DE
40FA  3E00    ld A,0
40FC  BE      CP(HL)                is this spot a space?
40FD  2038    JRNZ   print data
40FF  21D540  ld HL, 40D5:  address of header data
4102  CDE740  call 2 sp
4105  0604    ld B,4                4 chr$
4107  CDEC40  call b ch             "call"
410A  CDE740  call 2 sp
410D  CDE740  call 2 sp
4110  0603    ld B,3                3 chr$
4112  CDEC40  call b ch             "rpt"
4115  CDE740  call 2 sp
4118  0603    ld B,3                3 chr$
411A  CDEC40  call b ch             "qth"
411D  CDE740  call 2 sp
4120  CDE740  call 2 sp
4123  0604    ld B,4                4 chr$
4125  CDEC40  call b ch             "band"
4128  CDE740  call 2 sp
412B  0604    ld B,4                4 chr$
412D  CDEC40  call b ch             "mode"
4130  0620    ld B,32d              print a blank line
4132  3E00    ld A,0
4134  D7      RST 10
4135  10FD    DJNZ   print a blank line
4137  E1      POP HL                address of data
4138  CDE740  call 2 sp
413B  0606    ld B,6                6 chr$
413D  CDEC40  call b pr             call sign
4140  CDE740  call 2 sp
4143  110300  ld DE,3
4146  43      ld B,E                E has 3
4147  19      ADD HL,DE             skip 3 bytes of data
4148  CDEC40  call b ch             report
414B  CDE740  call 2 sp
414E  43      ld B,E
414F  04      INC B                 4 chr$
4150  CDEC40  call b ch             qth
4153  CDE740  call 2 sp
4156  D7      RST 10                print a space
4157  1D      DEC E                 E has 2
4158  43      ld B,E
4159  23      INC HL
415A  23      INC HL                skip 2 data bytes(time)
415B  CDEC40  call b ch             band
415E  CDE740  call 2 sp
4161  CDE740  call 2 sp
4164  1E09    ld E,9                check report
4166  97      SUB A,A               reset carry flag
4167  ED42    SBC HL,DE             (3rd chr$ of report)
4169  7E      ld A,(HL)
416A  BA      CP D                  is 3rd chr$ a 0?
416B  2808    JR    print"PH"       if so, print ph
416D  3E28    ld A,28               "C"
416F  D7      RST 10                print
4170  3E3C    ld A,3C               "X"
4172  D7      RST 10                print
4173  1806    JR    done printing
4175  3E35    ld A,35               "P" :print"PH"
4177  D7      RST 10                print
4178  3E2D    ld A,2D               "H"
417A  D7      RST 10                print
417B  1E05    ld E,5                done printing
417D  97      SUB A,A               reset carry flag
417E  ED52    SBC HL,DE             HL ready
4180  CDE740  call 2 sp
4183  3A2140  ld A,(4021)           A ready
4186  C39D40  JP 409D               to next n
4189  0616    ld B,22d              This routine calls the CLS
418B  CD2C0A  call 0A2A             routine from the ROM but
418E  C9      RET                   clears only 22 lines, leav-
                                    ing the 2 top ones intact.
```

M-LOG

```
   1 REM E(RND)▗ ;+4 IF 7?M5RND2
?;▒C))= ; FAST GOSUB ??RNDLEN  G
OSUB ? LPRINT S GOSUB TAN F FAST
 E(RND)"  ; FAST SGN LPRINT ▗▌ ,?▒
4▗F.( RUN /£Y▗▒▒?▗ ▒U5RND/ASN /1C
ALLRPT@THBANDMODEY NOT NOT TAN F
AST E£RND)? ;Y ▒4S5STR$ RNDLN SC
ROLL RND▗▖LN GOTO RNDLN SCROLL R
NDLN SCROLL RND▗▀▀LN GOTO RNDLN S
CROLL RND▗▀▀LN GOTO RNDLN SCROLL
RNDLN SCROLL RND▗▖LN GOTO RNDLN
SCROLL RND▗▖LN GOTO RND▗4Y NOT (
 CLEAR LPRINT LN SCROLL RND▗▗LN
GOTO RNDLN SCROLL RND)▀ ?;LN GOT
O RNDLN SCROLL RND?▗LN GOTO RNDL
N SCROLL RNDNOT 1?77LN GOTO RNDL
N SCROLL RNDLN SCROLL RND2▒▒ GOS
UB ?NOT YUNOT /▗YPNOT YHNOT 2▌▒
GOSUB ?LN SCROLL RNDU5RND?▒RND▗-
LN G▒TAN
  10 DIM A$(7)
  11 DIM B$(400,20)
  12 LET Z=(400*20)+20+PEEK 1640
0+256*PEEK 16401
  13 POKE 16508,INT (Z/256)
  14 POKE 16507,Z-256*PEEK 16508
  15 LET @SO=1
  16 DIM @$(4)
  20 PRINT AT 0,10;"N9BBN LOG"
  21 PRINT
  22 GOTO 400
  25 RAND USR 16777
  28 PRINT AT 19,1;@SO;TAB 12;W$
,M$
  30 PRINT AT 20,0;"CALL SIGN?"
  35 PRINT AT 1,0
  40 INPUT A$
  45 IF A$="MENU   " THEN GOTO 3
00
  50 RAND USR 16514
  60 PRINT AT 20,0;"SHALL WE LOG
 THIS CALL?"
  70 LET I$=INKEY$
  71 IF I$=CHR$ 118 THEN GOTO 10
0
  72 IF I$="N" THEN GOTO 25
  73 GOTO 70
 100 PRINT AT 20,0;"REPORT?
          "
 110 INPUT R$
 115 IF R$="" THEN LET R$="59"+(
"9" AND LEN M$=3)
 120 IF LEN R$=LEN M$ THEN GOTO
130
 122 PRINT AT 18,0;"YOU ARE ON "
;W$;" ";M$( TO 2);" BUT THE REPO
RT HAS ";LEN R$;" DIGITS.  WHAT
GIVES?"
 124 PRINT "TYPE ANY KEY"
 126 IF INKEY$="" THEN GOTO 126
 128 GOTO 25
 130 PRINT AT 20,0;"0TH?   "
 135 IF R$="59" THEN LET R$="59
"
 140 INPUT @$
 150 PRINT AT 20,0;"Z TIME?"
 160 INPUT Z$
 170 IF LEN Z$>=4 THEN GOTO 176
 172 LET Z$="0"+Z$
 174 GOTO 170
 176 LET Z1=VAL Z$( TO 2)
 178 LET Z2=VAL Z$(3 TO )
 180 LET Z$=CHR$ Z1+CHR$ Z2
 185 PRINT AT 19,0;A$( TO 6);"
  ";R$;"    ";@$;"    ","ALL OK?
"
 190 LET I$=INKEY$
 191 IF I$="" THEN GOTO 190
 195 IF I$="N" THEN GOTO 20
 200 LET B$(@SO)=A$+"  "+R$+@$+Z
$+W$
 220 LET @SO=@SO+1
 230 GOTO 25
 300 RAND USR 16777
 310 PRINT "INPUT CALLS","I","CH
ANGE BANDS","C","STOP","S"
 320 LET I$=INKEY$
 330 IF I$="I" THEN GOTO 25
 340 IF I$="C" THEN GOTO 400
 350 IF I$="S" THEN STOP
 360 GOTO 320
 400 PRINT "INPUT NEW BAND"
 410 INPUT W$
 420 IF LEN W$<>2 THEN GOTO 410
 430 PRINT W$,,,,
 440 PRINT "INPUT MODE-PH OR CW"
 450 INPUT M$
 460 IF M$<>"CW" AND M$<>"PH" TH
EN GOTO 440
 470 IF M$="CW" THEN LET M$="CW
"
 480 GOTO 25
1000 FOR N=16514 TO 16782
1010 PRINT N;
1020 INPUT X
1030 PRINT TAB 8;X
1040 POKE N,X
1050 NEXT N
```

POKES FOR 1 REM STATEMENT
STARTS AT 16514

```
42,16,64,17,6,0,25,126,22,5,35,94,131
21,32,250,35,119,50,33,64,30,15,25,19
190,40,17,17,20,0,25,229, 237,91,123
64,198,0,237,82,225,56
237,201,43,229,42,16,64,17,11,0,25
229,209,225,6,5,26,78,185,32,6,43,27
16,247,24,12,62,6,144,79,6,0,9,58,33
64,24,202,24,29,40,38,49,49,55,53,57
54,57,45,39,38,51,41,50,52,41,42,62,0
215,215,201,126,215,35,16,251,201,229
42,12,64,17,69,0,25,62,0,190,32,56,33
213,64,205,231,64,6,4,205,236,64,205
231,64,205,231,64,6,3,205,236,64,205
231,64,6,3,205,236,64,205,231,64,205
231,64,6,4,205,236,64,205,231,64,6,4
205,236,64,6,32,62,0,215,16,253,225
205,231,64,6,6,205,236,64,205,231,64
17,3,0,67,25,205,236,64,205,231,64,67
4,205,236,64,205,231,64,215,29,67,35
35,205,236,64,205,231,64,205,231,64
30,9,151,237,82,126,186,40,8,62,40
215,62,60,215,24,6,62,53,215,62,45
215,30,5,151,237,82,205,231,64,58,33
64,195,157,64,6,22,205,44,10,201
```

16782= LAST ADDRESS

(FROM JULY 1985 QEX)

Timex-1000 Program For Series Line Matching Sections For Impedance Matching

While recently reviewing Russell Prack's, K5RP, notes on "Series Line Matching Sections for Impedance Matching," January 1984 QEX (no. 23), it seemed that an appropriate computer program could be written for quick computation of the many variables.

Herewith is a listing of my program, for the Timex-1000. It is designed to accommodate any impedance feed line, and section matching line to any load impedance and load reactance. In addition, I have added computation of L1 and L2 lengths in decimal feet, for which frequency of interest is specified as well as velocity of propagation for both the feed line and matching section.

Note that whenever L1 computation results in a negative value, L1 (+180) will give the proper positive value to use. -- R. H. Knaack, Jr., W7FGQ, 11415 28th Ave. SW, Seattle, WA 98146.

```
100 REM       "SERIES SECT"
110 REM    SERIES SECTION LINE MATCHING - REF: QEX
           JAN 1984, AND ARRL ANTENNA HANDBOOK
           14TH EDITION
130 REM
140 REM    ARR: BY W7FGQ APR 85
150 REM
160 REM    L1 DESIGNATES LENGTH OF LINE FROM THE
           LOAD
170 REM
180 REM    L2 DESIGNATES LENGTH OF SERIES SECTION
190 REM
200 REM    RL IS LOAD IMPEDANCE
210 REM
220 REM    XL IS LOAD REACTANCE
230 REM
240 REM    ZØ IS LINE IMPEDANCE
250 REM
260 REM    Z1 SECTION IMPEDANCE
270 CLS
280 PRINT  "ENTER LINE IMPEDANCE ZØ"
290 INPUT ZØ
300 PRINT AT 9, 2; "ZØ = "; ZØ
310 PRINT AT 2, Ø; "ENTER SECTION IMPEDANCE Z1"
320 INPUT Z1
330 PRINT AT 11,2; "Z1 = "; Z1
340 PRINT AT 4, Ø; "ENTER LOAD IMPEDANCE RL"
350 INPUT RL
360 PRINT AT 9,16; "RL= "; RL
370 PRINT AT 6, Ø; "ENTER REACTANCE XL (JXL)"
380 INPUT XL
390 PRINT AT 11,15; "XL = ";XL
400 LET N = Z1/ZØ
410 LET R = RL/ZØ
420 LET X = XL/ZØ
430 LET B = R * (N-1/N) * (N-1/N) - (R-1)
    * (R-1) - (X*X)
440 LET B = ((R-1) * (R-1) + (X*X)) /B
450 LET B = SQR ABS B
460 LET A = R + (X*N*B) - 1
470 LET A = ((N-R/N) *B+X) /A
480 PRINT AT 14,2; "L1 (DEGREES) = ", INT ((ATN
    A*57.3) *1ØØØ) /1ØØØ
490 PRINT AT 16,2; "L1(+18Ø) = ",INT (((ATN A*
    57.3) +18Ø) *1ØØØ)/1ØØØ
500 PRINT AT 18,2; "L2 (DEGREES) = ", INT ((ATN
    B*57.3) *1ØØØ)/1ØØØ
510 PRINT ,,,, "TO COMPUTE LENGTHS, PRESS <ENTER>"
520 IF INKEY$="" THEN GOTO 52Ø
530 IF INKEY$<>"" THEN GOTO 53Ø
540 CLS
550 PRINT ,,,, "ENTER FREQUENCY F,MHZ";
560 INPUT F
570 PRINT TAB 27;F
580 PRINT ,, "ENTER L1 VELOCITY FACTOR";
590 INPUT VFA
600 PRINT TAB 27;VFA
610 PRINT ,,"ENTER L2 VELOCITY FACTOR";
620 INPUT VFB
630 PRINT TAB 27;VFB
640 PRINT ,,,, TAB 4; "L1(FT) = ",INT
    ((((ATN A*57.3) * (984/F) *VFA/36Ø
    *1ØØØ)/1ØØØ
650 PRINT ,, TAB 4; "L1(+180)FT=", INT
    (((((ATN A*57.3) +18Ø) * (984/F)
    *VFA)/36Ø) *1ØØØ)/
    1ØØØ
660 PRINT ,, TAB 4; "L1(FT) = ", INT ((((ATN
    B*57.3) * (984/F) *VFB)/36Ø) *1ØØØ)/1ØØØ
670 PRINT AT 2Ø,2; "TO RUN AGAIN, PRESS <ENTER>
680 IF INKEY$="" THEN GOTO 68Ø
690 IF INKEY$<>"" THEN GOTO 69Ø
700 GOTO 27Ø
```

```
   1 REM This program was ori-
ginally written by R. J. Lees-
W3ZON for the Timex-Sinclair
1000 computer and published in
the May 1983 issue of QZX.  This
modification was written for the
Timex/Sinclair 2068 computer by
Kraig D. Pritts-KA2LHO and makes
use of some of the expanded cap-
abilities of this machine.
   2 BORDER 5
   3 CLS
   5 LET l=Ø
  10 LET n=Ø
  20 LET c=Ø
  30 PRINT AT n,c;"■"
  50 IF INKEY$<>"" THEN GO TO 50
  60 IF INKEY$="" THEN GO TO 60
  80 PRINT AT n,c;INKEY$
  90 IF INKEY$=CHR$ 13 THEN GO T
O 300
 100 IF INKEY$=CHR$ 8 THEN GO TO
 400
 102 IF INKEY$=CHR$ 10 THEN GO T
O 450
 104 IF INKEY$=CHR$ 11 THEN GO T
O 475
 110 IF INKEY$=CHR$ 12 THEN GO T
O 500
 120 IF INKEY$=CHR$ 7 AND c=Ø TH
EN GO TO 600
 130 LET c=c+1
 140 IF c=32 THEN GO TO 410
 150 IF c<27 THEN PRINT AT n,c;"
■"
 160 IF c=27 THEN PRINT AT n,c;"
▗"
 170 IF c=28 THEN PRINT AT n,c;"
▄"
 180 IF c=29 THEN PRINT AT n,c;"
▙"
 190 IF c=30 THEN PRINT AT n,c;"
▐"
 200 IF c=31 THEN PRINT AT n,c;"
▀"
 210 GO TO 40
 300 PRINT AT n,c;" "
 320 GO TO 130
 400 PRINT AT n,c;" "
 410 LET l=l+1
 420 IF l=22 THEN GO TO 700
 430 LET n=n+1: GO TO 20
 450 PRINT AT n,c;" "
 455 LET l=l+1
 460 IF l=22 THEN GO TO 700
 465 LET n=n+1: GO TO 30
 475 PRINT AT n,c;" "
 480 LET l=l-1
 485 LET n=n-1: GO TO 30
 500 PRINT AT n,c;" "
 510 IF c=Ø THEN GO TO 530
 520 LET c=c-1
 530 GO TO 30
```

73, W4GHV & K5XY

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